

Hemorrhage of the Cord.—This may be either extradural, subdural, or intraspinal. The symptoms following extradural hemorrhage are at first somewhat akin to those of laceration of the muscular tissue surrounding the spinal column; but later on, owing to the extravasation of the blood, great pain is felt in the region involved, and still later, in some cases, symptoms of paralysis supervene. In the subdural variety the pain and paralysis occur much earlier and are then followed in almost every case by paralysis. On the other hand, in the intraspinal variety, symptoms of paralysis come on immediately, thus simulating fracture or dislocation of the spine. In some cases of hemorrhage of the spinal cord, where the hemorrhage is slight, absorption may take place and an ultimate recovery ensue. In other cases in which the symptoms are prolonged, the patient, instead of getting better, gradually grows worse; in which event it is the duty of the surgeon to operate and evacuate the blood or remove the clots that have formed.

Abscess of the Spinal Cord.—In all cases of abscess of the spinal cord, when diagnosed, an operation for the speedy evacuation of the pus should be performed and drainage established.

Tumors of the Cord.—These tumors are either of a benign or of a malignant type, and when recognized they should be dealt with in the same manner as are similar tumors when found in the brain. *Paul F. Eve.*

SPINE, TUBERCULOUS DISEASE OF THE.—(Synonym, Pott's disease.) Pott's disease is a chronic destructive process that affects the bodies of the vertebrae, the anterior and weight-supporting portion of the spinal column. As the disease progresses the part of the spine above the weakened point sinks downward and forward, throwing into relief the spinous processes at the seat of disease. Thus an angular posterior projection is the

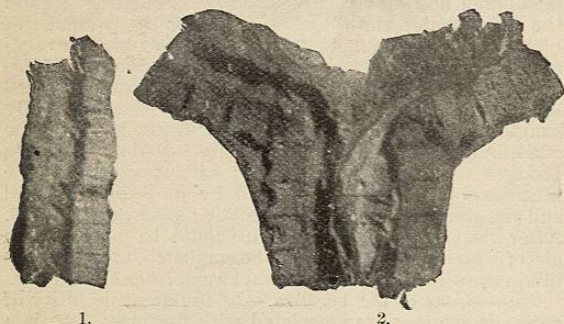


FIG. 4427.—Spinal Lesions in Pott's Disease. 1, Disease in two distinct regions of the spine; 2, a section of the spine showing the production of angular deformity.

characteristic deformity of Pott's disease, or rather of any process attended by local destruction of one or more of the vertebral bodies. If one vertebral body is destroyed, the projection is sharp and well defined; if several are involved, it will be less angular; and if one side of a vertebral body breaks down, there may be a slight lateral distortion as well.

The size of the deformity and its effect upon the individual depend in great degree upon its situation. If it is at either extremity of the spine the deformity is small, because so little of the spine is affected compared with that which remains free from disease. Thus, angular deformity in the upper cervical region simply shortens the neck, and disturbs the poise of the head. In the lowermost region it shortens the trunk and induces a peculiar attitude, but in either case the posterior projection or "hump" is slight; but when the middle of the spine is involved the opportunity for deformity is great and the entire spine may enter into the formation of the kyphosis.

PATHOLOGY.—The first indication of disease is usually found in the anterior part of a vertebral body beneath the longitudinal ligament. From this point the infected

granulation tissue, following the course of the blood-vessels, invades and destroys the adjacent spongy tissue. In other instances the disease may begin in several minute foci in the interior of a vertebral body near the upper or lower epiphysis. These, coalescing, gradually enlarge, forming a cavity; collapse follows and the deformity appears. Less often the disease advances beneath the anterior ligament as a form of tuberculous periostitis, without implicating deeply the substance of the vertebral bodies. The posterior part of the spinal column usually remains free from disease, unless it comes into direct contact with it.

The course and outcome of the disease depend upon its character. If the area of primary infection is limited, the local resistance may check its further progress and cure without deformity may follow. In other instances, although the area of active disease is small, it continues to progress and the deformity slowly increases, although unaccompanied by pain or by constitutional symptoms. In the majority of cases, however, the tuberculous granulations advance rapidly, destroying the bone or other tissues with which they come into contact. The usual retrograde metamorphosis to cheesy degeneration follows, and then very frequently liquefaction or abscess formation takes place.

In characteristic cases that come to autopsy during the progressive stage of the disease, one finds, on dividing the thickened tissues in front of the spine, a cavity the walls of which are lined with tuberculous granulations in various stages of degeneration and containing puriform fluids. The adjoining vertebral bodies present a worm-eaten appearance, and one or more of them is partially destroyed. Small fragments of necrosed bone and "bone sand" may be present, together with larger masses of degenerated tissue; less commonly sequestra of considerable size may be found, loose or embedded in the diseased area.

As the disease progresses it may force its way into the vertebral canal and press upon the spinal cord, involve its coverings, and cause paralysis of the parts below. Such a complication is more frequent when the disease begins in the centre or posterior portion of a vertebral body. In such instances the paralysis may precede the deformity. Pressure on the cord may be caused also by an abscess or a projecting fragment of bone. The calibre of the spinal canal may be lessened also by the pressure of the superincumbent weight upon the softened and thickened tissues at the seat of disease, but as a rule its capacity is not directly lessened by the characteristic angular distortion. In fact, pressure paralysis more often complicates cases in which the deformity is moderate or slight in degree than those in which it is extreme.

In rare instances tuberculous disease may appear in two regions of the spine simultaneously, but it usually begins in one or two adjacent vertebral bodies, one or both of which are partially destroyed. From this point the disease extends in either direction, and in ordinary cases the final area of deformity and rigidity shows that from three to six bodies are more or less involved before a cure is established.

At all stages of the disease resistance to its progress and local efforts at repair are evident in the affected parts. This is accomplished occasionally by contact and solid union of the adjoining surfaces of softened bone, but this is possible only when the area of the disease is small. If several bodies are destroyed there is usually backward displacement of the upper segment of the spine as it sinks downward. Thus the anterior surface of one or more of the bodies of the upper segment may be apposed to the upper surface of the lower body. In such instances the ankylosis is in part fibrous, in part cartilaginous, and in part bony. This may include the articular processes, the pedicles and laminae; in fact, ankylosis may be established here before repair has advanced appreciably in the anterior portion of the column.

Cure may be complete, no vestige of the disease remaining; or the diseased products may undergo calcareous degeneration and may be enclosed in newly

formed tissue. In other instances the disease is simply quiescent, and may show its presence from time to time by recurrent symptoms of discomfort, by abscess formation, or even by paralysis many years after apparent cure.

ETIOLOGY.—The etiology of tuberculosis of the spine does not differ from that of other bones; the subject is considered elsewhere.

Relative Frequency.—Tuberculosis affects the spinal column more frequently than it does any other single bone or joint. This point is illustrated by the statistics of tuberculous disease treated in the out-patient department of the Hospital for Ruptured and Crippled during a period of fifteen years: Tuberculosis of the spine, 3,207 cases; hip-joint, 2,230 cases; other joints inclusive, 2,408 cases.

Age.—Pott's disease, although far more frequent in the middle period of childhood (from the third to the tenth year), may occur at any time from earliest infancy to extreme old age.

STATISTICS FROM WHITMAN'S ORTHOPEDIC SURGERY.

	Cases.	Per cent.
Less than one year.....	38	3.1
Between one and two years.....	176	14.2
Between three and five years.....	627	50.2
Between six and ten years.....	234	18.3
Between eleven and twenty years.....	89	7.2
Between twenty-one and thirty years.....	43	3.5
Between thirty-one and fifty years.....	31	2.6
Over fifty years.....	11	.8

The youngest patient was two months old, the oldest seventy-one years.

Sex.—Sex exercises comparatively little influence upon the liability to disease of this region. In 3,822 cases 53.2 per cent. were in males and 46.8 per cent. in females (*loc. cit.*).

The Situation of the Disease.—The dorso-lumbar section of the spine is most often affected. Cervical disease is comparatively infrequent.

In the series of 1,355 cases (*loc. cit.*) the attempt was made to locate the origin of the disease by the most prominent spinous process in the tracing. The following are the conclusions:

Cervical.	Dorsal.	Lumbar.	Lumbo-sacral.
First, 3	First, 26	First, 94	13
Second, 3	Second, 43	Second, 96	
Third, 15	Third, 42	Third, 64	
Fourth, 20	Fourth, 46	Fourth, 57	No deformity.
Fifth, 13	Fifth, 49	Fifth, 6	Cervical, 2
Sixth, 22	Sixth, 76		Dorsal, 31
Seventh, 24	Seventh, 82	317	Lumbar, 22
	Eighth, 97		
	Ninth, 92		55
	Tenth, 110		
	Eleventh, 71		
	Twelfth, 120		
100			

Disease in two regions of the spine, 16.
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From these statistics, which do not differ essentially from those reported by others, it appears that the disease is much less common in the cervical than in the dorsal region. This may be explained by the greater strain to which the middle and lower part of the spine is subjected, as well as by the relatively larger proportion of cancellous tissue which offers the opportunity for infection.

PROGNOSIS.—Pott's disease is the most serious of all the tuberculous affections of the bones and joints, because of the relative importance of the structures directly and indirectly implicated. Prognosis must include also the indirect influence of the deformity. In the typical "humpback" deformity the contents of the thorax and abdomen are necessarily compressed, the blood-vessels are distorted and the calibre of the aorta is thereby often much diminished, respiration is made difficult, and the circulation is impeded. As a consequence the heart is usually hypertrophied or dilated, and valvular insufficiency is not infrequent. Thus the vital functions which

are carried on at a disadvantage even under favorable conditions become impossible under the added strain of unfavorable surroundings, overwork, or disease. It is a matter of common observation that few of those who are markedly deformed reach old age. On the other hand, it may be assumed that slight deformities, or those which do not as directly interfere with the vital functions, exercise but little influence upon the future well-being of the patient. This emphasizes the importance of early diagnosis and efficient treatment.

The direct mortality of Pott's disease cannot be accurately estimated, but at least twenty per cent. of all patients die during the progress of the disease and within a few years after its onset, from causes directly or indirectly dependent upon the local lesion. Some of these die from general dissemination of the tuberculous infection and tuberculous meningitis; some from exhaustion following septic infection or from amyloid degeneration and exhaustion dependent on long-continued suppuration; some from tuberculosis of the lungs, and many from intercurrent affections that are fatal because of the devitalizing influences of the disease and its complications.

SYMPTOMS.—The most positive sign of Pott's disease is deformity. At an early stage of the process there may be but a slight irregularity in the contour of the spine, and if several adjacent vertebral bodies are affected the projection may be somewhat rounded in outline. But as compared with other deformities of the spine, that of Pott's disease is characteristically angular, because its cause is loss of substance.

This angular deformity was once thought to be essential for diagnosis, but it is simply the result of disease that may have existed for months, a disease whose presence may be detected long before it reaches the destructive stage.

The spine is the most important support of the body, an elastic column that accommodates itself to every movement of the trunk and limbs. The early symptoms of a destructive disease must be therefore pain and functional disability. The spine also contains the spinal cord, from which branch the nerves that supply the organs and members of the body, and in certain instances the sudden onset of paralysis due to extension of the disease backward might occur early in the process. Or, again, abscess, one of the common accompaniments of tuberculous disease, might, because of its size or situation, become the most noticeable symptom.

These are symptoms that may be misleading, and it is well, therefore, to consider them apart from those that indicate the primary effect of the disease upon the spine considered as an elastic support. These direct symptoms usually precede and always accompany the secondary or complicating symptoms, and upon them the diagnosis depends.

The primary and diagnostic symptoms of Pott's disease may be classified as follows:

- Pain.
- Stiffness.
- Weakness.
- Awkwardness.
- Deformity.

The pain of Pott's disease is not usually localized at the affected vertebrae nor is it accompanied by sensitiveness to pressure or infiltration and swelling of the overlying tissues, as is usually the case when other bones are involved; for the vertebral bodies are within the trunk, almost as far from the spinous processes as from the anterior surface of the body.

Thus sensitiveness to direct pressure is unusual, and palpation, except in the cervical region, is of little diagnostic value.

The pain of Pott's disease is not localized, because the nerve filaments that supply the bodies of the vertebrae are insignificant parts of nerves that are distributed to distant points—to the head, to the limbs, to the front and sides of the body, and to these parts the pain is referred. Thus "earache" or "stomachache" or "sciatica" may

be symptomatic of Pott's disease of the different regions of the spine. This pain is by no means constant; it is rather occasional, induced by jars or by sudden unguarded movements. Often at night when muscular protection is relaxed, sudden movements during sleep cause discomfort or pain and the child moans, or is restless, and sometimes awakens with a cry—"night cry."

Stiffness of the spine is in some degree voluntary, in that the patient adapts himself to the disease and avoids, if possible, strain and jar, but the essential stiffness of Pott's disease is caused by the involuntary muscular tension and contraction of the muscles about the seat of disease. The degree of muscular spasm varies with the sensitiveness of the diseased tissues; thus it may fix the spine, or it may limit only the extremes of motion. Reflex muscular spasm precedes deformity and continues until a cure is established; it is therefore the most important of the diagnostic symptoms of Pott's disease.

A destructive disease of the most important support of the body it is a direct as well as an indirect cause of *weakness*; the younger the patient, the more apparent is this symptom which is shown by the "loss of walk," the refusal to stand, or the instinctive desire for support at an early stage of the disease.

Ackwardness.—Pain and weakness and rigidity of the spine induce changes in the habitual attitudes and movements of the patient that are often almost diagnostic of the disease and of the part of the spine involved.

The deformities of Pott's disease may be classified as—Bone deformity, muscular deformity, compensatory deformity.

The characteristic angular projection due to destruction of bone has been described already.

Muscular deformity is the distortion due to muscular spasm or contraction. Wry-neck, symptomatic of cervical disease, and psoas contraction, a common accompaniment of disease of the lower region, are the familiar examples.

Compensatory deformity signifies the general effect of the local disease and local distortion upon the spine as a whole. Thus an angular projection must be balanced by a compensatory incurvation, and lateral distortion in one direction by lateral distortion in another. These secondary changes in contour often attract attention before the primary local deformity is detected.

Although angular deformity is characteristic of the disease, lateral deviation of the spine is not infrequent. It may be direct distortion at the seat of disease, caused by the destruction of the side of a vertebral body; more often, it is a secondary effect of such irregular erosion at one or the other extremity of the spine. It may be caused by muscular contraction, or it may be due to simple bodily weakness. In such instances it is a transitory distortion.

Aside from direct deformity, there is usually at the earliest stage of the disease a slight change in the outline of the spine; it no longer forms a long regular curve when the body is bent forward, but an irregularity of contour, of limitation of normal flexion, is almost always apparent.

Secondary Symptoms.—**Abscess.**—In the retropharyngeal space the tumor of an abscess may interfere with respiration and deglutition. In the thoracic region it may, from the physical signs, be mistaken for pleurisy or empyema, and in the iliac fossa, when accompanied by psoas contraction, it may interfere with locomotion.

Paralysis is usually one of the later symptoms, but if the disease begins in the centre or posterior part of a vertebral body it may implicate the cord before deformity appears.

Abscess and paralysis are classed as complications because they must be explained by a proper diagnosis. Their appearance is always preceded and accompanied by the essential symptoms of Pott's disease.

General Symptoms.—If the disease is active or if an abscess is approaching the surface there is usually a slight but constant elevation of the temperature, but the positive value of the symptom in early or quiescent cases is

doubtful. A patient suffering from tuberculous disease of the spine usually presents the evidences of a painful and depressing affection and in many instances the appearances of inherited or acquired weakness; but these general symptoms are of comparatively little value in diagnosis.

Of the early symptoms of Pott's disease two have been noted as of especial importance—the impairment of normal mobility and the change in the contour of the spine. The contour of the spine varies considerably in the adult. It is affected by the occupation and by many other circumstances; of this the round shoulders of the cobbler or the weaver, the stoop of weakness and of old age, are familiar examples, but in childhood distinct variations from the normal contour almost always have a pathological cause. As the normal contour is the effect of the balancing of the body in the upright posture, it is evident that if the outline of one part is permanently changed, compensation for this change must be made in another part. Thus, when deformity is well marked the normal curves of the spine are often completely reversed, and even at an early stage of the disease the abnormal contour will often attract attention long before the characteristic angular projection has become apparent.

Although the spine is a flexible column that is constantly changing in outline with every movement and posture, yet the range and character of this motion vary greatly in its different parts. In the cervical and lumbar regions motion is extensive, but it is comparatively limited in the thoracic region because the intervertebral discs are thin, because of the overlapping spinous processes, and because it forms a part of the rigid thorax. It is evident that the symptoms of a destructive disease will show themselves far more quickly in those regions of the spine where motion is free than where it is slight, and that these symptoms will differ somewhat in character with the function of the part involved. Thus, in considering early diagnosis, and in fact treatment and prognosis, one should divide the spine into sections:

1. The neck part, that allows free motion of the head, ending at the third dorsal vertebra.
2. The rigid thoracic part, which includes the third and tenth dorsal segments.
3. The lower portion, made up of the two lower dorsal and the lumbar vertebrae, in which the principal movements of the trunk are carried out. One must bear in mind the distribution of the nerves because the characteristic pain is referred to their terminations, also the parts in relation to the spine at different levels that may be implicated in the disease. Thus, remembering that the symptoms of Pott's disease are in general stiffness, weakness, pain, and deformity, one will always apply these symptoms to a particular region of the spine and will picture to himself the effect of such stiffness, weakness, and deformity at this or that vertebra; the effect of an abscess in this or that situation, and the area of paralysis that might be caused by pressure on the cord at one or another level.

The Rational Signs.—The symptoms of Pott's disease vary not only with the region of the spine involved, but also with the age and surroundings of the patient.

Tuberculous disease of the spine is usually an insidious chronic affection which does not often attract attention in its incipency. The child may cry after overexertion or injury, but at other times it may appear, to the unobservant eye, to be in its usual health. When the diagnosis is finally made, however, the parents always remember that something was "wrong" with the child, that it was fretful and disinclined to play, that it liked to lie on the floor, that it was awkward in its movements, that it was troubled by a cough or indigestion or by oppression of breathing. These symptoms, which are readily explained by the disease, do not as a rule attract attention until deformity appears.

An exact history of the case is often of importance both as to prognosis and as to treatment. For example, one should inquire if the immediate relatives of the child have suffered from phthisis or other form of tuberculosis;

also if the child has always been strong, and if recovery from the ordinary ailments of childhood was prompt or tedious, in order that one may judge of the quality of the patient. One next asks, not "How long has the child been ill?" for this is usually understood to refer to the duration of the more decided symptom, but, "When was the child last perfectly well?" Then as to the onset of the first symptoms, whether it was sharp and decided, or gradual and ill defined; and whether the symptoms were preceded by contagious disease or by injury. If there is a history of injury it should be made clear whether the injury was the direct cause of the symptoms, or if it may have simply aggravated or brought to light the dormant disease. To establish injury as the sole and direct cause of symptoms, the patient must have been well at the time of the accident, the symptoms must have followed immediately and have continued since; and, finally, the symptoms must be of such a nature as to be explained by a definite injury.

Physical Examination.—Although histories are usually indefinite and misleading, it is commonly made clear that the affection is chronic, although its course has been varied by acute exacerbations. This is the characteristic of tuberculous disease.

The diagnosis is, however, almost entirely dependent upon the physical examination. This begins on the first sight of the patient, when one notes the general condition and the actions and postures. These show the adaptation of the body to the disease, the conscious and unconscious efforts of the patient to guard the weak part from strain that induces pain and discomfort.

The object of the physical examination is to compare the part suspected of disease with the normal, and the examination must be purposeful.

When one asks the patient to pick up a coin from the floor—the popular test for Pott's disease—one employs it to test the mobility of the lower region of the spine, the region in which the motions of stooping and turning the body are carried out; remembering that such movements are often not restrained in the slightest degree by disease in the upper portion of the spine.

Such tests must not only be purposeful, but they must be adapted to the age and intelligence of the patient. The child that refuses to pick up a coin will often gather up its clothing, because it wishes to be dressed again. If it will not stoop it will usually rise if placed in the recumbent or sitting posture, which is an equally useful test. A child will walk toward its mother if placed at a distance from her. It will always turn its head toward her, and therefore voluntary motion of the cervical region may be tested by changing the mother's position, while the child is held by the examiner.

Young children who struggle and resist passive motion, if placed on the table, submit quietly when held in the mother's arms.

The most important of the early signs of Pott's disease is the peculiar stiffness due to the reflex action of the muscles. This spasm limits movement in all directions. It is always present from the beginning of the disease until consolidation is finally completed.

The muscular rigidity is most marked in the neighborhood of the disease, but it extends to a greater or less distance, according to the acuteness of the local process and the susceptibility of the patient. Even at an early stage the situation of the disease is usually shown by a slight irregularity of the spine in the centre of the area made rigid by muscular spasm, as well as by the change of contour. This change in outline and flexibility may be demonstrated by bending the patient forward. If the spine forms a long, even, regular curve, and if there is no evidence of pain or rigidity when such an attitude is

assumed, Pott's disease is extremely improbable. If, on the other hand, the outline of the curve is broken, if the motion of one section of the spine is restrained by muscular rigidity, disease may be suspected, and, if other evidence of tuberculous osteitis is present, the diagnosis may be made with certainty.

By a careful physical examination one may expect to detect Pott's disease at any stage and to fix upon its location, or at least upon the point suspected of disease. One will then ask one's self if tuberculous disease of the bodies of the vertebrae of this particular region will satisfactorily explain all the symptoms of which the patient complains; if, for example, the pain corresponds to the

distribution of the nerves, if restraint of function will explain the attitudes of the patient, if the change of contour is significant of a destructive process, and the like.

The Lower Region.—As has been stated, the spine should be divided into regions according to varying function.

Of these regions the lower is the most important from the standpoint of relative liability to disease, and, as it is the movable region of the spine, the symptoms of disease here are usually evident long before the destructive stage.

The characteristic attitude of the patient is one in which the body is swayed backward. Often there is an increased hollowness (lordosis) of the back; thus, the prominent abdomen may first attract attention. The walk is careful, and often there is a peculiar tiptoeing step, which lessens the jar on the sensitive spine. This gait, although most common as an accompaniment of disease of this region, is simply an evidence that the spine is sensitive to slight jars. More characteristic of lumbar disease is a peculiar waddle, explained in part by the exaggerated lordosis, and in part by the loss of the accommodative balancing motion of the lumbar spine, as the weight falls alternately on the legs in walking.

The increased lumbar lordosis so characteristic of the early stage of the disease is capable of several explanations. It is partly voluntary, the backward inclination relieving the pressure upon the diseased vertebrae. It is partly involuntary, caused by the contraction of the large

muscular masses on the posterior aspect of the spine. It is in part compensatory, as the slight psoas contraction which is often present has a tendency to tilt the pelvis forward, necessitating a greater compensatory backward inclination of the body.

As the disease progresses, the lumbar section becomes straighter, and finally it may project backward in the characteristic angular deformity. Yet even after the lordosis has been changed to a kyphosis the backward inclination of the body still continues as a compensation for the reversal of the lumbar curve.

Slight psoas contraction simply increases the lordosis, but when the contraction is more extreme and persistent, the erect attitude is no longer possible. The limbs are drawn toward the body and the body is inclined forward to relax the tension. This greater contraction, which is usually symptomatic of abscess formation, is most often limited to one side. Thus the patient inclines the body somewhat forward and toward the flexed leg, "favors it," and the resulting limp is usually mistaken for a sign of hip disease. Unilateral psoas contraction of this character is, in fact, so often present when the patient is first brought for treatment, that a limp and the accompany-

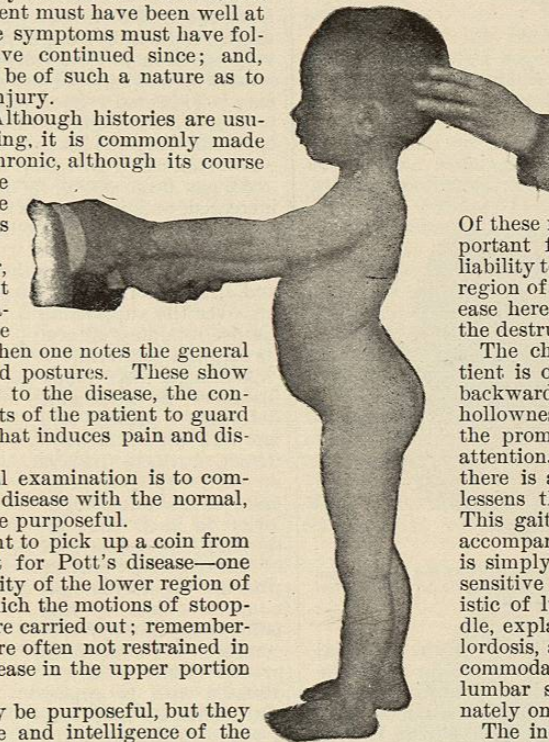


FIG. 4428.—Pott's Disease in the Lower Dorsal Region, showing Compensatory Lordosis.

ing inclination of the body may be considered as characteristic of more advanced disease of the lumbar region. The location of the pain depends upon the distribution of the nerves that supply the diseased vertebrae, or that

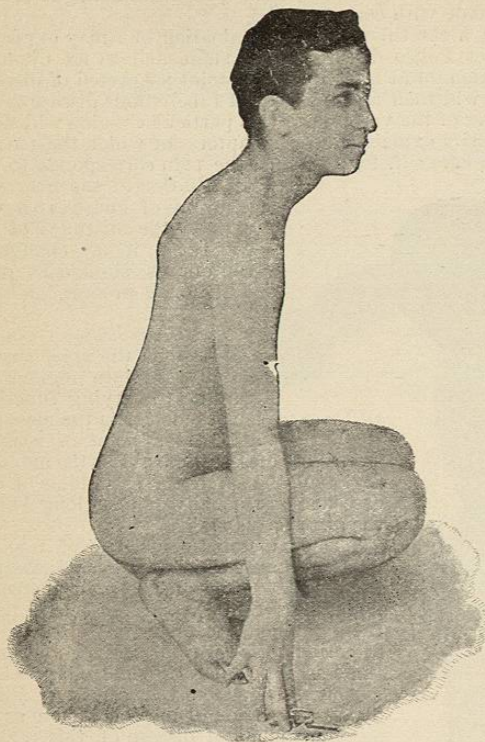


FIG. 4429.—Pott's Disease of the Lower Region before the Appearance of Deformity, illustrating the Manner of Picking up an Object from the Floor.

pass in its vicinity. It may radiate over the inguinal region or backward to the loins or buttocks, or down the front or back of the legs to the knees. Painful cramp is not infrequently a symptom, the thigh is spasmodically drawn toward the body, and the patient seizing it with both hands shrieks with pain.

Lateral inclination of the body is often present. Commonly it indicates unilateral psoas contraction, or at a later stage it may be caused by collapse or destruction of one side of a vertebral body. In other instances it is simply adaptation to weakness or pain, an attitude similar to that caused by persistent sciatica.

The effects of the stiffness, weakness, and pain are usually sufficiently apparent. For example, the child may be unable to turn in bed. If the disease is at all active, the standing is more comfortable than the sitting posture, in which more weight is thrown upon the sensitive vertebral bodies. When seated, particularly when riding in a carriage or street car, the patient often sits upon the edge of the seat, the shoulders only touching the back, while the hands rest instinctively on the seat, partially supporting the weight and steadying the spine.

Stooping, a posture that increases the pressure in the diseased vertebral bodies and which necessitates muscular tension and strain in regaining the erect position, is particularly difficult, and it is always avoided by the patient if the disease is at all acute. For example, when the child is asked to pick up an object from the floor, it either refuses or it squats on the heels or drops upon the knees instead of flexing the spine as in health. Young children having seized the object upon the floor, regain the erect attitude by pushing the body up by the pressure of the hands upon the thighs. If the child is placed upon the floor it will, if possible, seize the mother's

dress, or will crawl to a chair or other object, upon which the body may be drawn up by the arms, so that the discomfort caused by muscular contraction of the back muscles may be avoided.

After this preliminary observation and examination the patient should be placed at full length, face downward, on a table, and the range of extension and of lateral motion is then to be tested by lifting the legs and swaying the body gently from side to side. One should always test for psoas contraction by holding the pelvis firmly against the table with one hand while the leg in the line of the body is gently lifted by the other. As tested in this manner the normal range of extension should allow the knees to be lifted two or three inches from the table. Slight restriction of extension of both thighs, indicating a slight degree of psoas contraction, is very common in Pott's disease, but when the restriction is marked, and especially if it be unilateral, a deep abscess may be expected. Such unilateral psoas contraction may be more clearly demonstrated by placing the child on the back, allowing the limbs to hang over the table, when the unaffected thigh will drop below its fellow.

As has been stated, in many instances the lordosis is increased, and in all cases flexion of the lumbar spine is much more restricted in the early stages of the disease than is extension. This rigidity and fixation may be demonstrated by placing the child on its hands and knees and lifting it from the floor, the trunk, instead of bending over the supporting hands, retaining almost its original contour.

Although in many instances no noticeable deformity is present, still one can almost always detect a slight fulness about the spinous processes or a slight irregularity in their line, indicating the exact seat of the disease. Strong pressure upon the spinous processes at this point may induce discomfort, and sometimes greater elasticity at the diseased area is apparent. This is, however, a test of comparatively little value.

Abscess is very commonly a complication of disease in this region of the spine, and it may be suspected when persistent unilateral psoas contraction is present in marked degree. In such cases the patient may be turned upon the side, and by deep pressure one may often detect an elastic tumor in the loin or pelvic fossa.

The diagnosis of Pott's disease, even in the early stage, is comparatively easy on careful and systematic physical examination. It is most often mistaken for some one of the following affections:

Lumbago.—This is an acute affection, usually of adult life, of sudden onset, characterized by local pain and by sensitiveness of the muscles themselves.

Strain of the back has as a rule a well-defined cause.

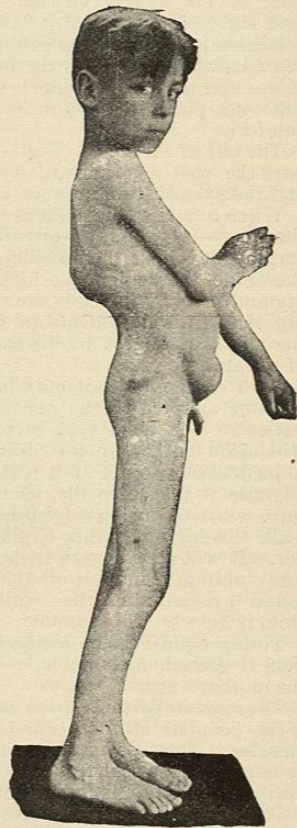


FIG. 4430.—Showing the Attitude of Over-erectness Caused by Compensation for Deformity; also abscess presenting itself in the inguinal region.

Like lumbago, its onset is sudden. The pain is usually localized at the point of injury and it is relieved by rest. In Pott's disease the pain is neuralgic, it is often worse at night, and the stiffness due to reflex muscular spasm is quite different from that caused by strain.

Sciatica.—The pain of sciatica is most often unilateral; it is usually confined to the distributions of this nerve. The pain of Pott's disease, if it is referred to the legs, is usually bilateral. In sciatica movements of the limb often aggravate the pain, while motion of the spine is free or but slightly restricted.

The reverse is true of Pott's disease. In persistent sciatica of long standing, lateral deviation and even rigidity of the lumbar spine are sometimes observed; but if the latter symptom is marked, the diagnosis may be regarded as open to question.

Sacro-iliac disease is far more likely to be mistaken for disease of the hip-joint than of the spine. The pain and sensitiveness are usually localized about the seat of disease, and the motions of the spine are but slightly restricted.

The attitude characteristic of Pott's disease of this region—viz., the hollow back, the prominent abdomen, combined with the waddling gait—may be simulated by bilateral congenital dislocation of the hip and by certain forms of nervous disease in which the muscles of the back are weak, as, for example, progressive muscular atrophy, or pseudohypertrophic muscular paralysis. In these affections the characteristic symptoms of bone disease are of course lacking.

Hip Disease.—When psoas contraction is present in lumbar Pott's disease it induces a limp, and not infrequently the patient complains of pain in the affected limb. These symptoms are usually mistaken for those of hip disease. The limp of Pott's disease is caused simply by flexion of the leg; when, therefore, in the physical examination the tension of the contracted ilio-psoas muscle is relieved by flexing the thigh still further, the other movements of the hip—flexion, rotation, and the like—may be shown to be free. In hip disease all motions are restrained in equal degree by muscular spasm.

Hip Disease in Infancy.—In infancy sympathetic spasm of the lumbar muscles is often present in hip disease, and a similar spasm of the muscles about the hip may accompany disease of the lower part of the spine. In doubtful cases of this character the application of a temporary support to the back and limbs, as, for example, a plaster spica bandage which will relieve the secondary spasm, is an aid in diagnosis.

Secondary Hip Disease.—An infected abscess in the neighborhood of the hip-joint may finally set up secondary disease of its structure, and in the presence of discharging sinuses that involve the tissues about the hip it is not always possible to decide whether or not the joint is actually diseased.

Pelvic Abscess.—As abscess is a common complication of Pott's disease it will be necessary to consider abscesses of other origin within the pelvis or in the neighborhood of the spine that may induce symptoms resembling somewhat those of Pott's disease. The most common abscesses other than those resulting from disease of bone are the perinephritic and appendicular. As a rule these are of sudden onset, and are attended by local pain and by constitutional symptoms. There is of course no deformity of the spine.

Chronic abscess in the pelvis, of other than spinal origin, may be the result of disease of the pelvic bones, or of the sacro-iliac articulations, or of the hip-joint. It may be caused by the breaking down of lymphatic glands, or it may have its origin in inflammation about the uterine appendages, and cases of so-called idiopathic inflammation and suppuration of the ilio-psoas muscle have been described. In childhood chronic abscesses in this locality are almost always tuberculous in character, and are caused by disease of bone, either of the spine or of the pelvis. Disease of the spine can be determined usually by the methods already indicated, but, if the abscess is of other origin, its exact cause can be decided in many instances only by an operative exploration.

Abscesses of this character, of slow and apparently painless formation, may finally cause a swelling in the inguinal region or about the saphenous opening, that in the adult is not infrequently mistaken for hernia. In practically all cases, however, the tumor of the abscess may be made out on palpation within the pelvis, while the swelling, although its contents may be in part forced into the abdominal cavity, feels very differently from that of an ordinary hernia, which may usually be completely reduced. In addition, some sign of the disease of the spine or pelvis, of which the abscess is a result, is almost always present.

Pott's Disease in Infancy.—Attention has been called to the great importance of carefully observing the movements and postures of the patient, and of noting the contour of the spine when the patient is in the erect attitude. In Pott's disease of infancy such observations are of course not possible. As a rule at this age the muscular spasm is more intense and its extent is greater. The child screams when it is moved or lifted. There is usually no difficulty in determining the presence of disease from the evidence of rigidity and pain, but, as has been stated, it is sometimes difficult to decide whether the lumbar spine or one of the hip-joints is involved. Slight

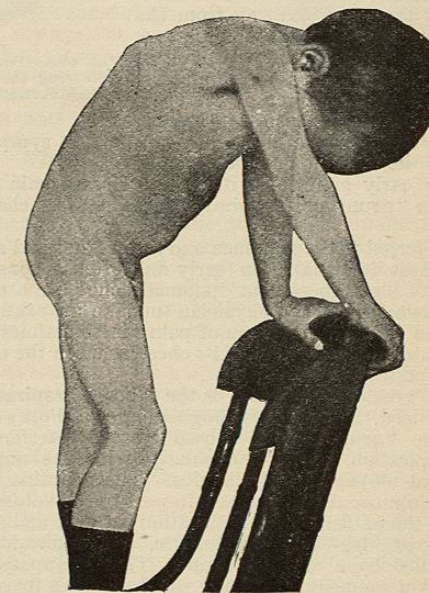


FIG. 4432.—Illustrating the Change from the Normal Contour, made Evident when the Patient Bends Forward.

irregularity of the spinous processes, indicating the position of the destructive process, is often evident at an early stage and early abscess is not unusual.

Pott's disease of infancy and early childhood is most often mistaken for rachitic deformity, or, rather, this deformity is often mistaken for that of Pott's disease.